user manual

Line amplifier NVD-family

- **Remote control by DOCSIS-Transponder DOTRA 1.0**
- **DOCSIS-Transponder DOTRA 1.0 available with DOCSIS and EURO-DOCSIS-modem**
- **Comfortable user interface by web browser, HTML based**
- **Ethernet port for local operation 10Base-T**
- **Electronic operation of all adjustment elements by remote**
- **ICS = Ingress Control Switch 0/6/31dB**
- **Comfortable error location and system state check**
- **Modular DOCSIS transponder DOTRA 1.0**
- **High quality die cast housing**

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1. Precaution

This unit has been manufactured to satisfy the international safety standards.
Please read the following safety precautions carefully.

OVERLOADING

Do not overload a wall outlet, extension cord or adapter as this may result in fire or electric shock.

LIQUIDS

This unit shall not be exposed to dripping or splashing objects also filled with liquids, such as vases, shall not be placed on the gadget.

CLEANING

Disconnect the unit from the main supply before cleaning. Do not use any kind of solvents to clean the unit only use a soft-dry cloth.

EARTHING

Take note of the official advices of antenna earth grounding.

LOCATION

Place the unit indoor in order not to expose to lightening, rain or sunlight.

Additional safety advice at the end of this user manual!

2. Technical specification

Downstream

Type:		NVD 8128…		NVD 8128R…		Remarks
article-no.	EuroDOCSIS **…-ED** DOCSIS **…-D**	5700 1590 5700 1592		5700 1591 5700 1593		
Final stage		1x Push Pull Power Doubler Hybrid				
		min.	typ.		max.	
Frequency range	MHz		47/85-1000			dependent on Diplexer
Gain IN – OUT1	dB	27	28		29	
Gain IN – OUT1,OUT2	dB	2x23,5				by use of 2-way splitter VM 202-2
Ripple	dB		±0,5		±0,7	
Input attenuation	dB		0…15,5			0,5 dB steps
Interstage equalizer	dB		0…20			at 1000MHz
0 point loss	dB		±0,5			1 dB steps
Interstage-attenuation	dB		0/6			
or alternatively ALC via QAM CMTS Kanal	dB		±3,5			accuracy ±0,5 dB
Test point input	dB		-20			F-connector, female, internal 5…1000MHz
Test point output	dB		-20			F-connector, female, internal 5…1000MHz
Return loss input	dB	18-1.5dB per Oct. min. 13 dB				
Return loss output	dB	18-1.5dB per Oct. min. 13 dB				
Noise	dB		5		6	
Output level CSO > 60 dB / 42 Ch.	dBµV	113				
Output level CTB > 60 dB / 42 Ch.	dBµV	111				

Instructions for start-up:

For networks with frequency range up to 606 MHz: Equalization input with EZM 606

For gain reduction or equalization of signal slope first use if possible the interstage attenuator or the interstage equalizer.

Type:			NVD 8138…		NVD 8138R…		Remarks
article-no.	EuroDOCSIS DOCSIS	**…-ED** **…-D**	5700 1594 5700 1596		5700 1595 5700 1597		
Final stage			1x Push Pull Power Doubler Hybrid				
			min.	typ.		max.	
Frequency range		MHz		47/85-1000			dependent on Diplexer
Gain IN – OUT1		dB	37	38		39	
Gain	IN – OUT1,OUT2	dB	2x33,5				by use of 2-way splitter VM 202-2
Ripple		dB		±0,5		±0,7	
Input attenuation		dB		0…15,5			0,5 dB steps
Interstage equalizer		dB		0…20			at 1000MHz
0 point loss		dB		±0,5			1 dB steps
Interstage-attenuation		dB		0/6			
or alternatively ALC via QAM CMTS Kanal		dB		±3,5			accuracy ±0,5 dB
Test point input		dB		-20			F-connector, female, internal 5…1000MHz
Test point output		dB		-20			F-connector, female, internal 5…1000MHz
Return loss input		dB	18-1.5dB per Oct. min. 13 dB				
Return loss output		dB	18-1.5dB per Oct. min. 13 dB				
Noise		dB		5		6,5	
Output level CSO > 60 dB / 42 Ch.		dBµV	113				
Output level CTB > 60 dB / 42 Ch.		dBµV	111				

Instructions for start-up:

For networks with frequency range up to 606 MHz: Equalization input with EZM 606

For gain reduction or equalization of signal slope first use if possible the interstage attenuator or the interstage equalizer.

Upstream

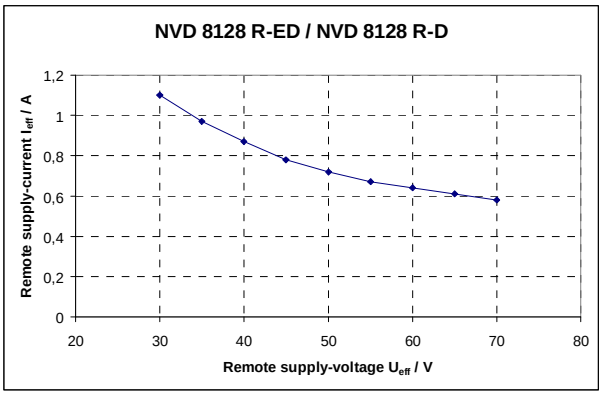
Type:			NVD 8128…	NVD 8128R…	NVD 8138…	NVD 8138R…	Remarks
article-no.	EuroDOCSIS DOCSIS	**…-ED** **…-D**	5700 1590 5700 1592	5700 1591 5700 1593	5700 1594 5700 1596	5700 1595 5700 1597	
Final stage			1x Push Pull Hybrid				
			min.	typ.		max.	
Frequency range		MHz		5 - 47/65			dependent on Diplexer
Gain, switchable OUT1 – IN		dB	20 / 28	22 / 30		23 / 31	
Ripple		dB		±0,7		±0,9	
Attenuation		dB		0…15,5			0,5 dB steps
Slope		dB dB		0…15,5			reference: 65MHz 0,5 dB steps
Return loss input		dB	18-1.5dB per Oct. min. 13 dB				
Return loss output		dB	18-1.5dB per Oct. min. 13 dB				
Noise		dB		10		11	
Output level DIN 45004A1 (IMA 2. Ordnung,-60dB)		dBµV	114		114		
Output level DIN 45004B (IMA 3. Ordnung,-60dB)		dBµV	119		119		
Output bit error rate at 120dBµV (2carrier: 16QAM,8MHz 1carrier: 16 QAM, 3,2MHz)		BER			$1*10^{-6}$		
carrier-to-intermodulation ratio at output level 115 dBµV		dB					
Output bit error rate at 115 dBµV (4 carriers; QAM 64; 5,12 Msym/s)		BER			$1*10^{-8}$		
Output modulation error ratio at 115 dBµV (4 carriers; QAM 64; 5,12 Msym/s)		Abschnitts-MER / dB	39				
Insertion loss passive 5-65 MHz		dB		2,5		3,0	until 65 MHz
		dB		> 35			from 85 MHz
Insertion loss 85-1000 MHz		dB		> 40			until 65 MHz
		dB		1,2		1,5	from 85 MHz

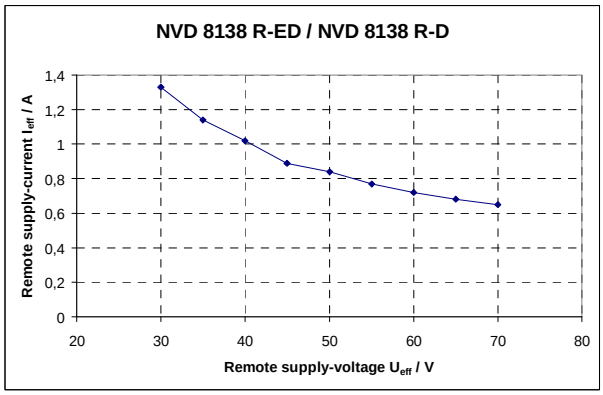
Electrical characteristics

Type:			NVD 8128…			NVD 8138…			Remarks
article-no.	EuroDOCSIS …-ED DOCSIS …-D		5700 1590 5700 1592			5700 1594 5700 1596			
Power supply type			switch-mode power supply						
			min.	typ.	max.	min.	typ.	max.	
Power supply		V_{AC}	185	230	265	185	230	265	50 Hz
Power connection		dB	EU power plug			EU power plug			
Cord length		m		1,3			1,3		
Power consumption		W		25			28		incl. DOTRA 1.0
Hum modulation suppression		dB		>60			>60		
Remote current (Remote power path)		A			10			10	15 A fuse
Internal power supply		V_{DC}		24 12 5			24 12 5		triple voltage switch-mode power supply
Power indicator			LED green			LED green			LED on power supply
ambient temperature		℃	-20		+50	-20		+50	
Impedance Input / Outputs		Ohm	75			75			
Safety acc			EN 60065			EN 60065			
EMC			EN 50083-2			EN 50083-2			

Type:			NVD 8128R…			NVD 8138R…			Remarks
article-no.	EuroDOCSIS …-ED DOCSIS …-D		5700 1591 5700 1593			5700 1595 5700 1597			
Power supply type			switch-mode power supply						
			min.	typ.	max.	min.	typ.	max.	
Power supply		V_{AC}	28	50	70	28	50	70	50 Hz
Current consumption		A	view diagram below for details			view diagram below for details			incl. DOTRA 1.0
Hum modulation suppression		dB		>60			>60		
Remote current (Remote power path)		A			10			10	15 A fuse
Power indicator		V_{DC}		24 12 5			24 12 5		triple voltage switch-mode power supply
Power indicator			LED grün			LED grün			LED on power supply
ambient temperature		℃	-20		+50	-20		+50	
Impedance Input / Outputs		Ohm	75			75			
Safety acc			EN 60065			EN 60065			
EMC			EN 50083-2			EN 50083-2			

Remote supply current in dependence of remote supply voltage





Mechanical data

Type:			Remarks
Body dimensions BxHxT	mm	251 x 256 x 124	
Weight	kg	4,4	
Number of inputs 1)	Stk.	1	PG11 (5/8” with adaptor)
Number of inputs 1)	Stk.	1 (3)	PG11 (5/8” with adaptor)
Number of test points	Stk.	3	F-female vertical internal
Potential equalization		M4-Erdungsschraube an Druckgußgehäuse	
top cover screws	Stk.	2	4 mm allen key
type of protection		IP 65	
protection class		II	

1) Take note:
For the connection with 5/8“-fittings please use the adapter PG11m-5/8f (article-no.: 5700 0204)

Attention!
The centre conductor of the input and output terminals and the coaxial cable can carry remote supply-voltage.
At mounting of cable fittings PG 11- or 5/8”-adapters remote power must be switched off.

For gain reduction or equalization of signal slope first use if possible the interstage attenuator or the interstage equalizer.

Adapter and cable connectors

Shorten pin length without a burr according to figure!
Too long pin length results in damage!

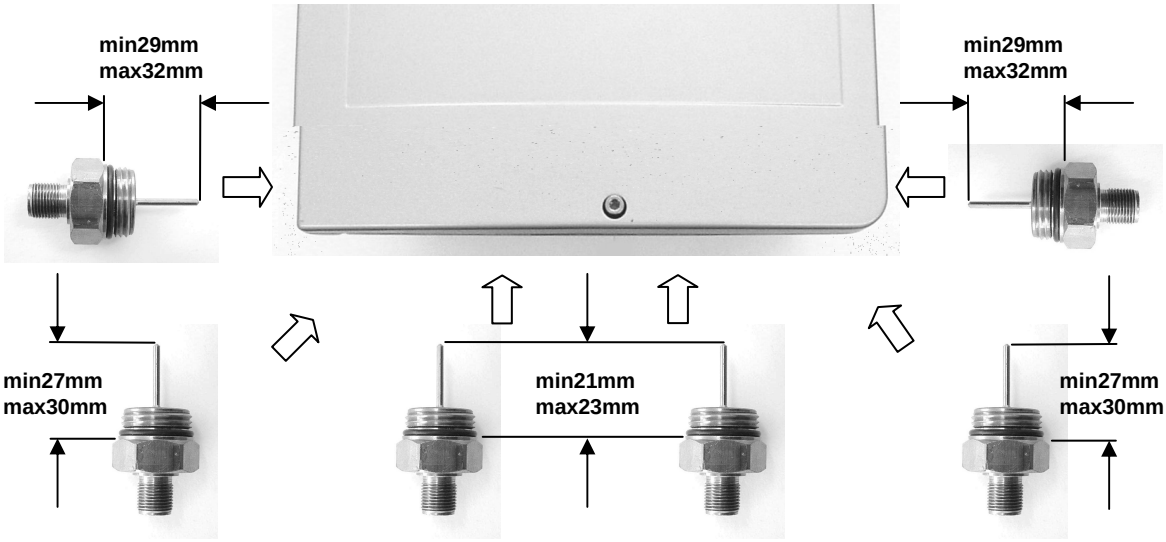


Abb.: Adapter PG 11m – Ff (article-no. 5700 1082)

3.6 System equalizer for frequency range (740-862 MHz) accentuation

Type:		KD 731	Remarks
Article No.		5700 1431	
Frequency range	MHz	5 - 720 MHz 3 dB 740 - 862 MHz 0,7 dB	
Equalization	dB	2,3	in range 720 – 862 MHz
Basic attenuation	dB	0,8	at 862 MHz
Linearity		± 0,2	

3.7 Deemphasis equalizer

Type:		DEM 10	Remarks
Article No.		5700 1356	
Frequency range	MHz	47 - 862	
Equalizer	dB	0…10	at 47 MHz

3.11 Adaptor for module position (X), (Y), see block diagram

Type:		ID 100	Remarks
Article No.		10161 637	
Frequency range	MHz	0 - 862	
Attenuation	dB	0 - 20	dependent on used PAD

Take note:
The adaptor ID 100 is standardly delivered with PAD 6 L.
This adaptor can also be used with equalizer moduls of the EZP-/EZL-series and KD 731.

3.12 Spare parts

Type:	0dB jumper	Jumper return path amplifier	Screw terminal block voltage feed	Remarks
Article No.	3530 0381	1610 0093	1600 0125	not listed in catalogue

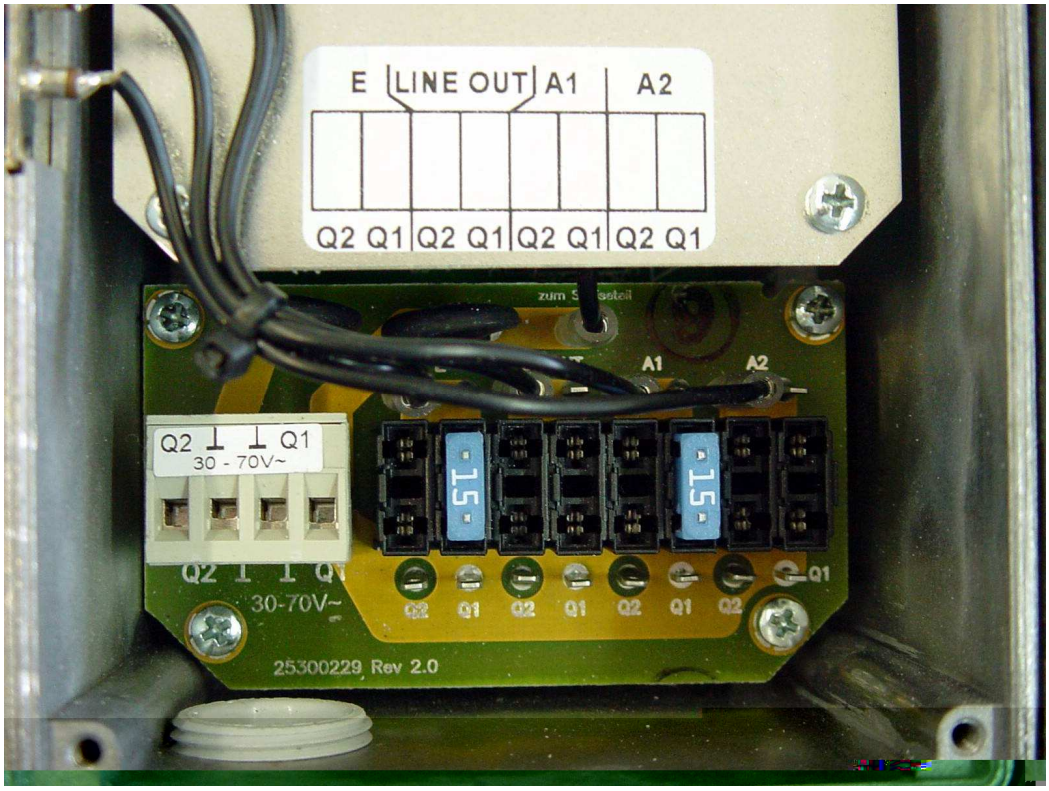
Type:	Fuse 15A	Skrew for connection terminal	Return path amplifier	Remarks
Article No.	1610 0109	2580 0129	3530 0297	not listed in catalogue

4. Error diagnosis

possible errors:	Error cause:
LED off	*connected power plug? power supply or fuse fault*
No gain	*power supply or fuse fault, amplifier fault, return way not plugged in or at wrong position*
Low gain	*level attenuator or slope attenuator low, interstage loss at the 6dB position* *Controller-pcb plugged in correct? All pins connected in the socket?*
No reaction of the DOCSIS modem	*Controller-pcb plugged in correct? Is there a network connection at local access? Is the Cable Modem logged into the CMTS? Is there access to the user interface?* *Missing or to high or to low Up- or Downstreamlevel*

5.3 Fernspeisung / *remote powering*

NVD 8xxx RP: Fernspeisepfad-Konfiguration mit Hilfe der Sicherungseinsätze /

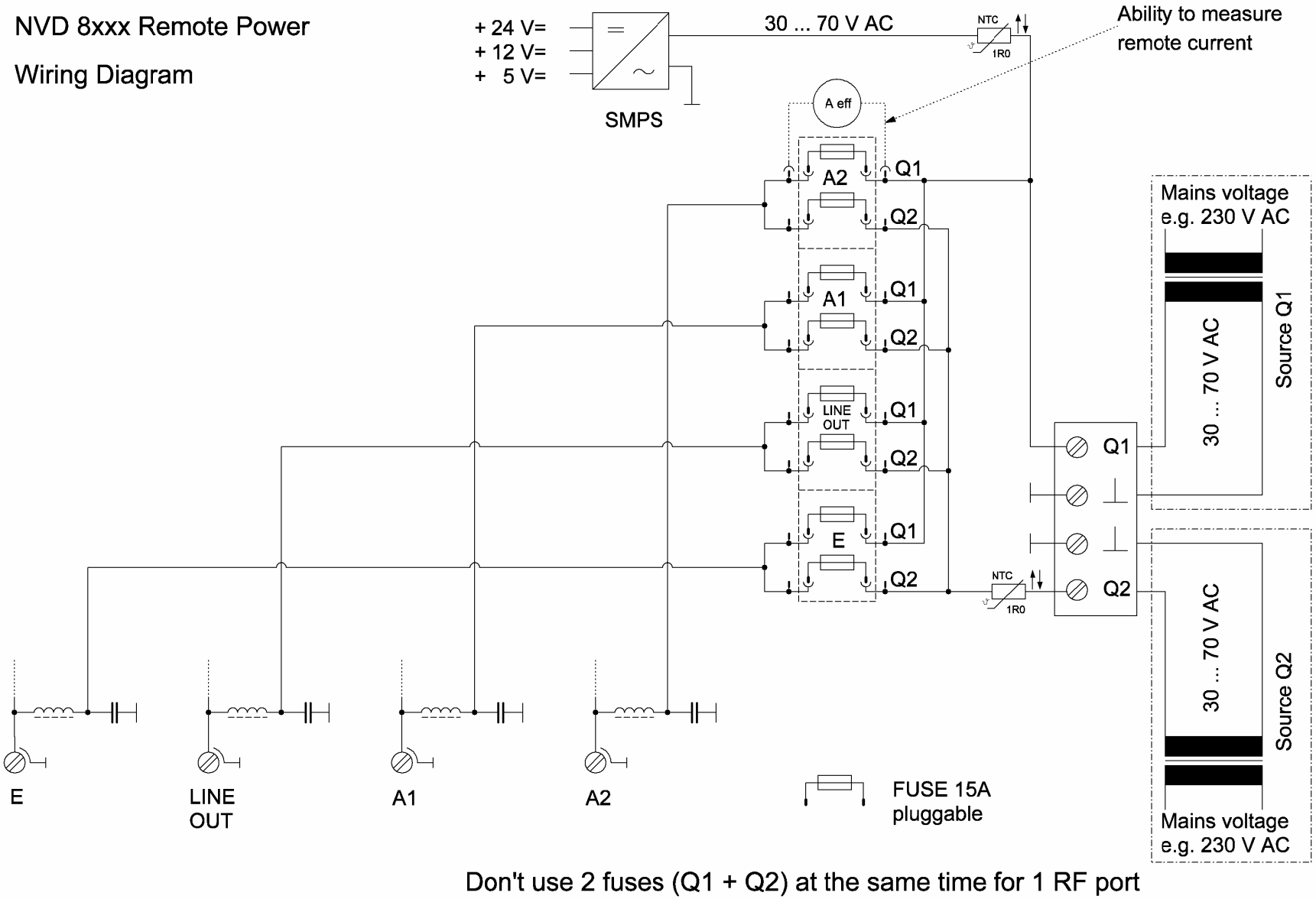


2 Sicherungen im Steckplatz (Q1 und Q2) für einen HF-Anschluss dürfen nicht gleichzeitig eingesteckt sein!

Die Richtung der Fernspeiseversorgung kann mit Hilfe der eingesetzten Sicherungen konfiguriert werden (siehe Seite 3: Stromlaufplan)

NVD 8xxx Remote Power

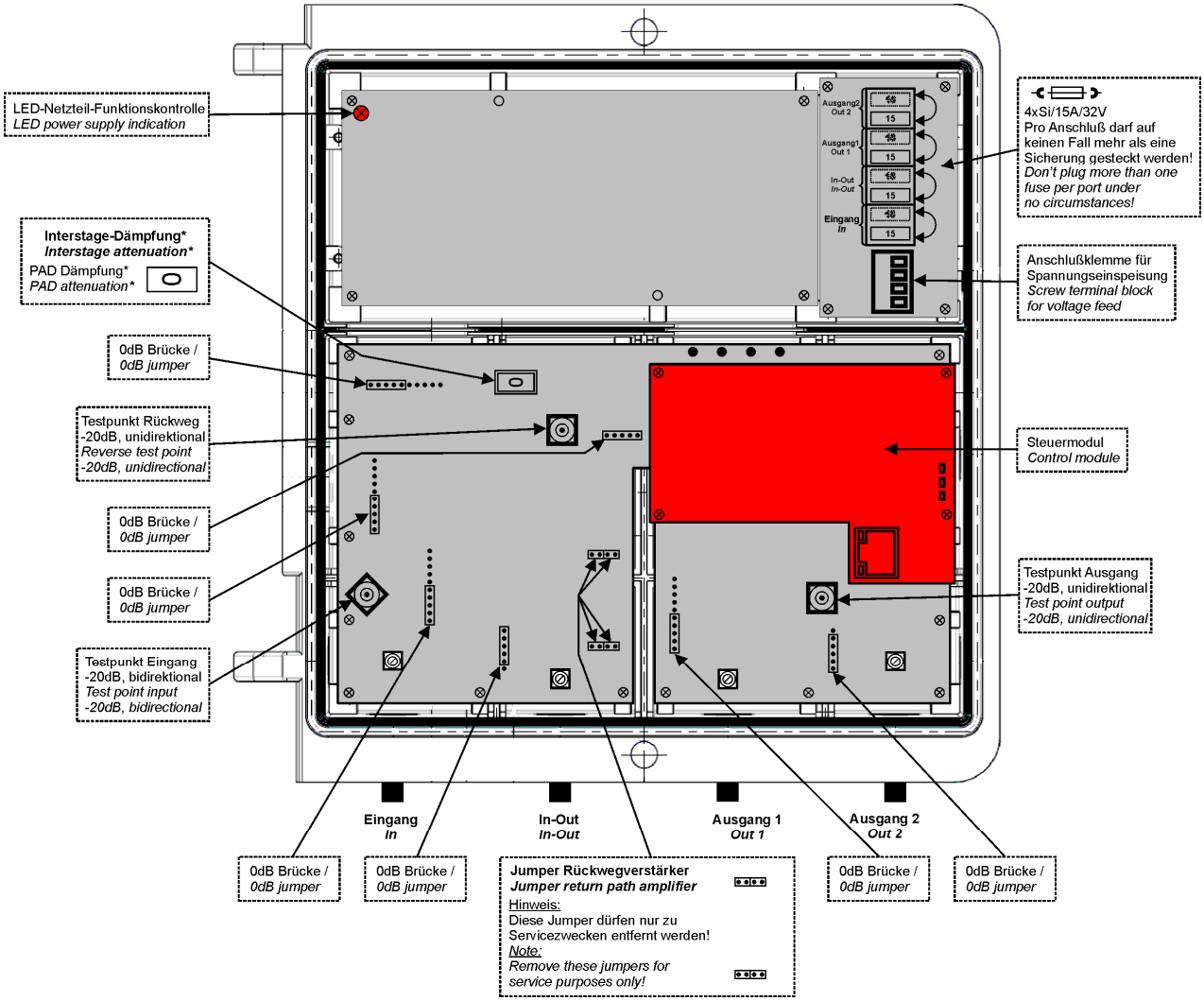
Wiring Diagram



Don't use 2 fuses (Q1 + Q2) at the same time for 1 RF port

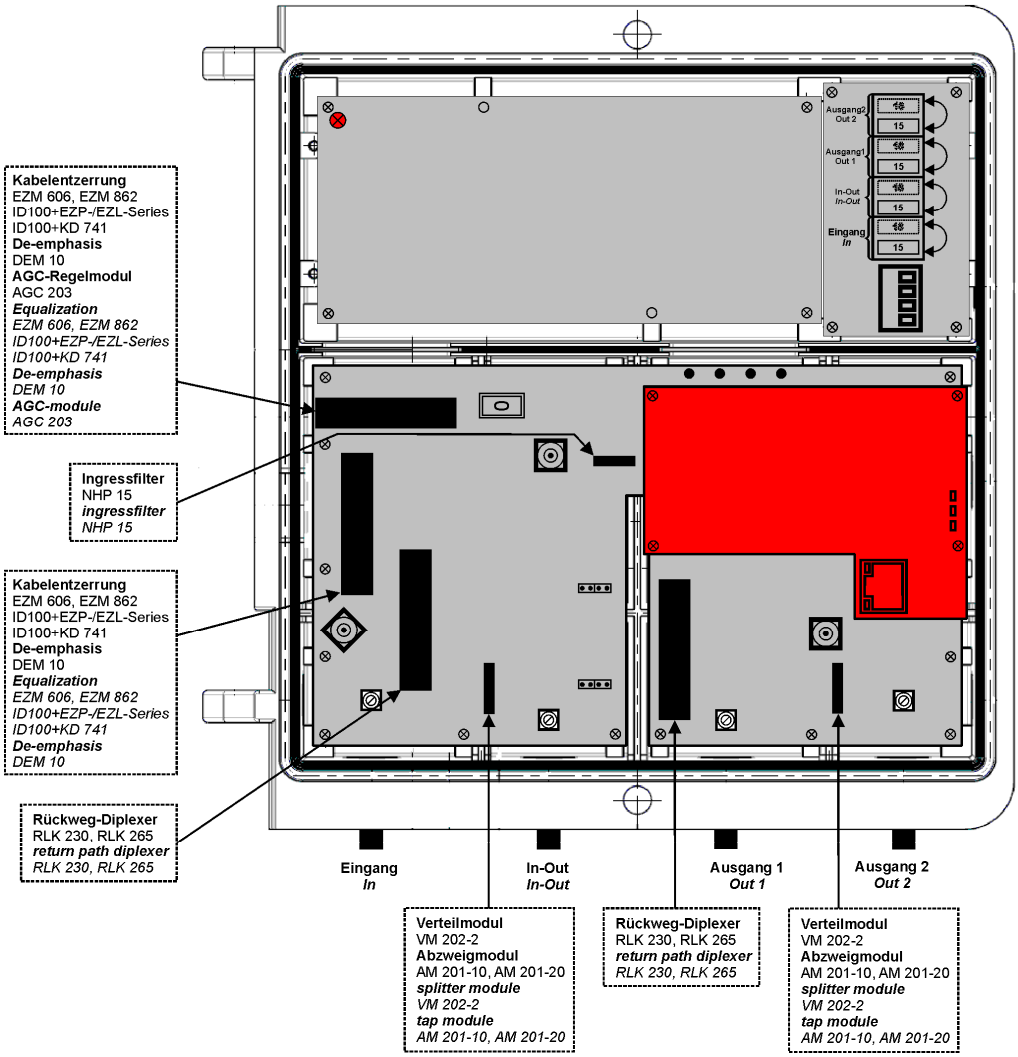
5. In-/Outside

5.1 Adjustments and positions for jumpers and PAD's

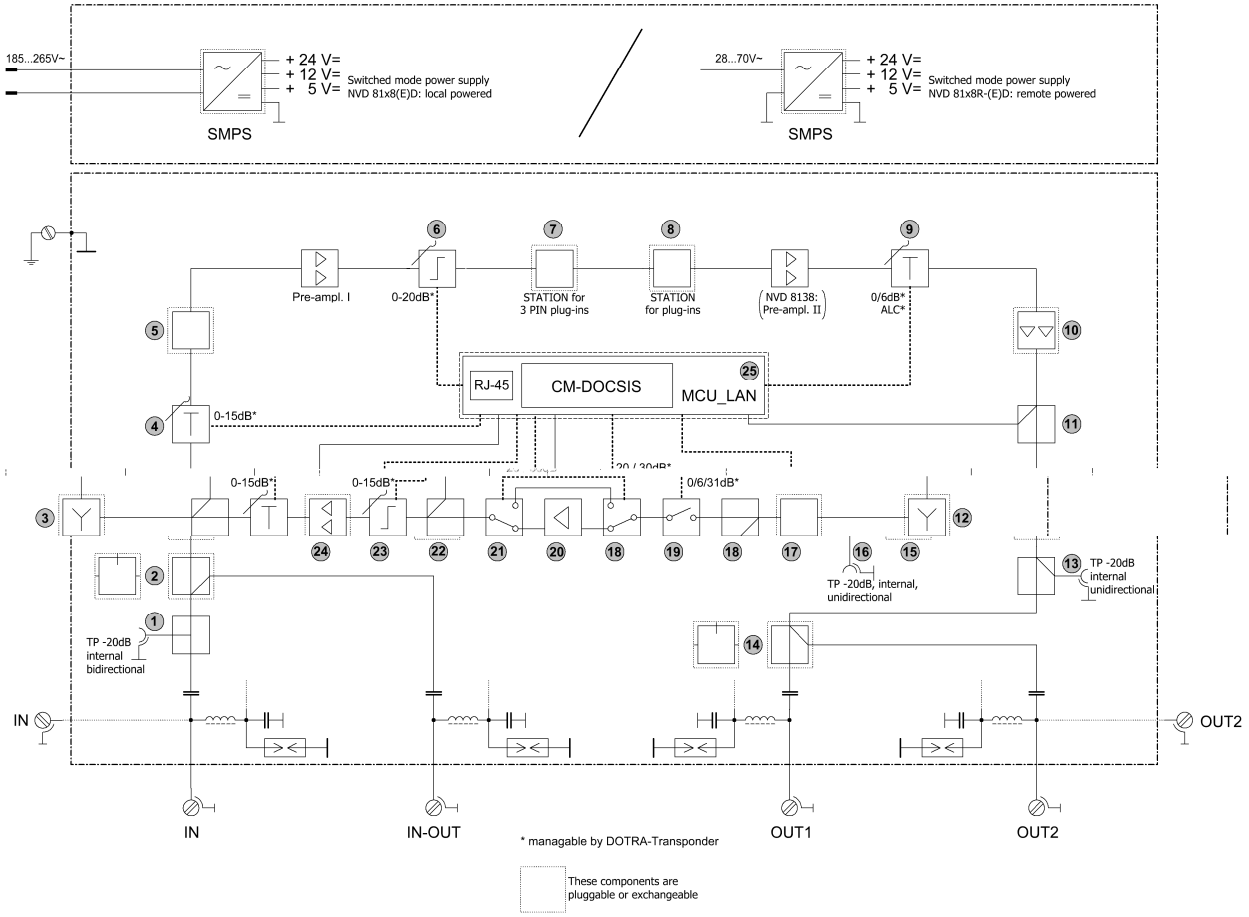


Take note:
NVD-series needs PAD's of length 25,4 mm (1")
*At the positons for Interstage-attenuation modules of EZP-/EZL-series or KD 731 could be also plugged in

5.2 Adjustments and positions for modules



6. Block diagram



Short description NVD 8128 (E)D / NVE 8128 R-(E)D / NVD 8138 (E)D / NVD 8138 R-(E)D

1. Input test point -20dB, F-socket internal, bidirectional
2. Plug-in slot for input and line-out with splitter type VM 202-2 or tap type AM 201-XY
3. Plug-in slot for return path diplexers for 30 or 65 MHz; Type: RLK 230, RLK 265
4. Input attenuation 0…15.5dB, electronically adjustable in 0.5dB-steps
5. Equalization 606 or 862 MHz, plug-in slot for module EZM 606 or EZM 862.
   At this plug-in slot there is also the possibility to use an ID 100 with EZP- or EZL-module or an ID 100 with KD 731.
6. Interstage equalizer 1000MHz, 0…20dB, electronically adjustable in 1dB-steps.
7. Equalization 606 or 862 MHz, plug-in slot for module EZM 606 or EZM 862.
   At this plug-in slot there is also the possibility to use an AGC-module type AGC 203, an ID 100 with EZP- or EZL-module or an ID 100 with KD 731.
8. Interstage attenuation, with PAD's in 1dB steps selectable.
   At this plug-in slot there is also the possibility to use an EZP- or EZL-module or an KD 731.
9. Interstage attenuation, electronically 0/6dB, alternatively ALC (only if registered with CMTS)
10. GaAs-FET power doubler hybrid
11. Tap modem receiving data line RX
12. Plug-in slot for return path diplexers for 30 or 65 MHz; Type: RLK 230, RLK 265
13. Out test point -20dB, F-socket internal, unidirectional
14. Plug-in slot for OUT1 and OUT2 with splitter type VM 202-2 or tap type AM 201-XY

15 Plug-in place for ingressfilter, e. g. NHP 15.

16 Return path test point -20dB, F-socket internal, unidirectional

17 Return path ingress switch, 0/6/31dB

18 amplification switch 22/30dB

19 preamplifier 8dB

20 Tap modem transmitting data line TX

21 Return path equalizer 65MHz, 0…15,5dB, electronically adjustable in 0.5dB-steps.

22 Return path amplifier push-pull hybrid plugable, contained in the scope of supply.

23 Return path attenuation, 0…15,5dB, electronically adjustable in 0.5dB-steps.

24 alternative Tap modem transmitting data line TX, assembly variant on request!

25 DOTRA 1.0 EURO-DOCSIS or DOCSIS transponder

7. Important Safety advice

Please read these safety advice's carefully before installing or putting into service your equipment and follow their instructions.
The equipment may only be used in dry rooms. In humid rooms or outdoors there is a danger of shortage (caution: risk of fire) or electric shock (caution: danger of life).
Choose the place of installation or mounting so that under no circumstances liquids or objects can get into the equipment (e.g. condensation, water coming from leaky roofs or watering etc.).
Never expose the equipment to direct sun and prevent every other source of heat from coming near the equipment (e.g. heaters, other electrical equipment, chimney etc.)
Ventilating slots and dissipaters are important parts of the equipment. For devices that are equiped with dissipaters or ventilating slots it is therefore absolutely necessary to make sure that they are under no circumstances covered or blocked. Also care for a generous air circulation around the equipment. In this way you avoid possible damages to the equipment as well as a risk of fire caused by overheating.
In order to prevent your equipment from damages and to avoid possible consequential damages the devices foreseen for wall mounting may only be installed on flat ground.
In order to avoid dangerous overvoltages (e.g. risk of fire and danger of life) the earthing of the connected devices must be considered. Especially the VDE-regulation 0860 (corresponding to EN 60065) and the relevant regulations for the installation and operation of antennas and antenna systems according to VDE-regulation 0855 (corresponding to EN 50083 or EN 60728) must be observed.
The place of installation or mounting must allow a safe laying of all the cables connected.
Power supply cables as well as feeder lines may not be damaged or squeezed by objects of any kind.
Furthermore, it is absolutely necessary that cables do not come near any source of heat (e.g. heaters, other electrical equipment, chimney etc.).
Design the place of installation or mounting so that the power plug can be reached and pulled out of the socket easily in case of danger. Choose the place of installation or mounting considering that children may not play unsupervised near the equipment and its connections.
Before opening the equipment pull out power plug or remove power supply, otherwise there is danger of life. This is also valid for cleaning the equipment or working on the connections.
Repairs on the equipment may only be carried out by specialists observing the valid VDE-Regulations.
Provided that an exchangeable fuse exists the power plug must be pulled out before changing the fuse. Defective fuses may only be replaced by fuses that comply with the standards and have the same nominal value.